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Power Technical School

Presented by:
Ken Kalinowski, Senior Service Technician
Sunrise Medical LLC

| MANUAL | POWER | ADULT | PEDIATRICS | SEATING | GERIATRICS | CONTROLS | FUNDING |

Agenda and Course Objectives

8:00	Power Wheelchair Details and Overview
	Examples: Pulse, S636, QM-710
	Batteries & Access
	Suspension – Electronics
	ASAP Seating Adjustments
9:30	Electronics
	Battery Chargers
	VR2 – R-Net 90
10:00	Break Time
10:15	Programming
	VR2 with Qtronix Pad; R-Net
	Programming – DTT & On Board Programming
11:45	Discussion and Overview
12:15	End of Half Day

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2

Rehab Power Ladder Example

- For Mid Wheel Drive (MWD)

QM-710 w/ Rnet
MPC – K0861

QM-7 Series Rnet
SC – K0856
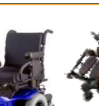
Pulse 6 -
SC – K0856

QM-710 w/
Rnet BC – K0848

Pulse 6 –
BC – K0848

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3

Mid & Rear Wheel Drive Power Family

Pulse 6
MWD

QM-710
MWD

S-636
RWD

All Group Three Power Chairs

4

Example: Power Portfolio Strategy

- **Simple and reliable**
  - Focused
    - Example: Specializing in Group 3 Power with three models
  - Proven Reliability in Components
    - Motors
    - Electronics
    - Tilt Module
  - Made in the USA

5

Example: Models

Pulse 6 BC
K0848

Pulse 6 SC
K0856

6

MWD - Pulse 6 Specifications

- HCPCS Code
  - Pulse 6 BC: K0848
  - Pulse 6 CC: K0849
  - Pulse 6 SC: K0856
- Drive Wheel Position
  - MWD
- Speed
  - 6.0 mph
- Drive Wheel Tires
  - 13"
- Battery Type
  - 22 NF
- Turning Radius
  - 22"
- Product Weight
  - 235 - 260 lbs.

- User Weight Capacity
  - 300 lbs.
- Overall Base Width
  - 24.5"
- Overall Length
  - 33.9"
- Seat Width
  - 12" – 22"
- Seat Depth
  - 12" – 22"
- Seat to Floor Height
  - BC: 16.5", 17.5", 18.5"
  - CC: 17", 18", 19"
  - SC: 17.5", 18", 19.5"

VR-2 Electronics

- Highly reliable and fully functioning non-expandable control platform
- Economical thru-drive capability for tilt
- Attendant control option

Two Point Reclining Armrest

- Provides additional support during transfers
- Ability to unlatch to flip back
- Can be adjusted to orient the arm parallel to the ground
- Remains solid during tilt
- Acts as an additional thigh support
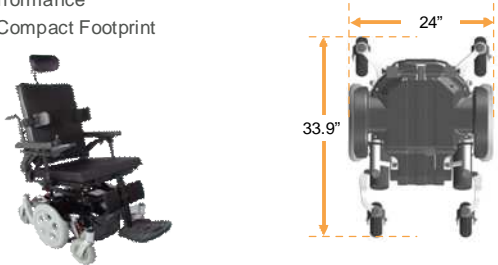
Pulse 6 : Footprint

Performance
- Compact Footprint

24"

33.9"
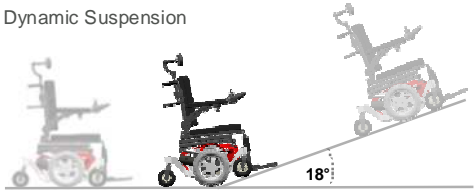
10

Pulse 6 : Performance

Performance
- 6 mph standard
- Dynamic Suspension

18°

11

Pulse 6: Backrest Options

- **JAY SPO & ART SPO Backrests**
  - Great complement to ASAP and SPOT adjustable seat frames
  - Modular foam insert construction
  - Countless in-field adjustment opportunities

JAY SPO Back   A.R.T. SPO Back

12

Pulse 6 : Tilt

Single **P**ower **O**ption **T**ilt (SPOT)
- As low as 17" STFH
- 50° range

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Pulse 6: Hanger Options

- Fixed Centermount
- 90 deg
- 75 deg taper
- 70 deg Swing-away
- 65 deg Swing-away
- Power Center mount single and Ped.

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ASAP II Seating Adjustments

- The ASAP II seating system is fully adjustable to allow changes from 16" to 20" or
- 18" – 22" (requires -Frame Weldment and Seat Pan Plates change) - for seat growth.
- The picture shown in figure 1 – shows a 20" wide seat width
  This detail will show how easy to change back to 16" wide.

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ASAP II Seating Adjustments

- **Step 1** – Confirm that you have a 3mm – 4mm – and 5mm Allen Hex keys available for making adjustments.
- **Step 2** - Loosen front M8 Cap screw bolt - with a **4mm** Allen Button Head Cap screw driver or Allen key. These are seen attached to plate on Figure 1.
- There is no need to take both out for this plate slides with size changes of seat.
- **Step 3** - Remove **3mm** Allen Hex Key Socket Head Cap Screws M8 x 1.25 size that are supporting the wings left and right to the seat frame

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ASAP II Seating Adjustments

- **Step 4** - Take out the **5mm** head bolts that are used to hold bottom seat in place – totally remove out of its position. Shown on figure below.

- **Step 5** - Take out bolts that are in Rear seat weldment – brace using a **4mm** Allen Hex Key and a 10 mm open end wrench or ratchet shown below in pictures.

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ASAP II Seating Adjustments

- **Step 6** - Loosen Back bracket off of chair to allow for changes to seat – note it is recommended to use the back width to accommodate the user – so 16 with 16 wide – 18 with 18" and so fourth.
  Note: However if the need occurs that a ½ " change is needed the brackets shown in picture in Figure - show you have the ½" change needed for a 1" change .

- **Step 7** – Remove 2 bolts from Seat Bracket attached to the back cane assembly – with a **5mm** Allen Hex Key and ½ inch nut using either open end or Ratchet.

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ASAP II Seating Adjustments

- Push Frame pieces back into place
- Tighten 5mm bolts of Seat Base – tighten 4mm bolts of seat base only one side on front and back this plate will slide. Also tighten the bolts from each of the wings where it mounts to seat -using 3mm.
- Finally Tighten the 3mm Allen Hex Key Button Head Screws back into place

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ASAP II Seating Adjustments

- Retighten Front and Back 4mm Allen Hex Key Socket Head Cap Screws in place for support piece.

- Retighten in place the bolts supporting the back.

ASAP II Seating Adjustments

- Check all bolts and if you run into any of the bolts not matching see bottom of Seat Frame depicted below 2 adjustment area of inside where frame inserts and outside where frame attaches.

ASAP II Seating Adjustments

- Check to make sure all parts are tightened and check width 16" wide complete and measures up to expectations

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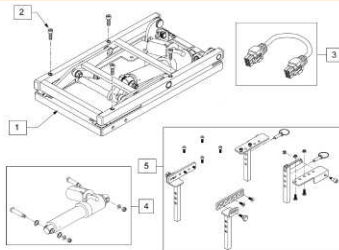
22

Pulse 6: Tilt Module

- Tilt Module mounts between the ASAP seat and power base
- **The module is replaced as an entire unit**
- Tilt modules can be added after initial purchase if necessary

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Pulse 6: Tilt Module Retro Kit

- Note: If adding tilt to a chair w/o tilt, Retro Kit must be ordered and the following electronics must be ordered separately:
  - VR2 w/ thru drive (Joystick-105376 & Controller – 104451)
  - R-net or VR2 w/ Toggle (Toggle retro kit – 110842)
  - R-net w/ thru drive (no other items needed)

Pos.	Item Number	Description	Remarks
1,4	109230	MDL PWR TILT SPOT ADJ LIM 16	
2	059225	SHCS M6 X 1.25 X 25	
3	025053-040	HARNESS DELPHI ACTUATOR 400mm	
4	109064	Actuator kit	
5	105602	INTERFACE/POST ASSM KIT	
1,3	110844	PULSE TILT RETRO KIT	

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Mounting Tilt to ASAP Seat

Harness Routing Instructions

- For chairs with tilt install the adaptor harness.
  - The 3-way connector plugs into the controller OBC port.
  - The 6-way connector accepts the actuator harness from the tilt.
  - The 4-way connector mates either to the TM40 flying lead or the drive-through harness.

Actuator Adaptor Connector

Drive-Through Actuator Harness
(Drive-through tilts only)

VR2-90 Controller Connector View

See the photos in upcoming slides

Serial Number Location

Old Placement of Serial Number   New Placement of Serial number

22NR Batteries and Connections

Batteries Connected   **Batteries Disconnected**

Red Wire Disconnected   **Back Wire Disconnected**

28
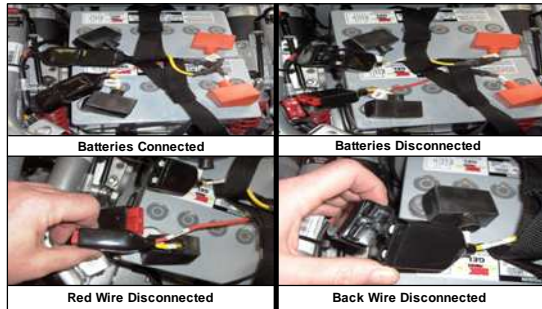
Pulse 6: Shroud Connections
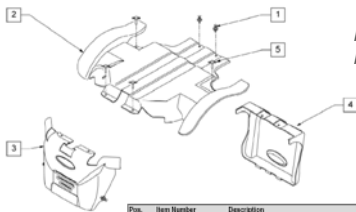
New Shroud Connections, May 2009

Pos.	Item Number	Description	Remarks
1	104439	HARDWARE SHROUD	Includes 5 fasteners
1,2	104410	SHROUD TOP KIT RED	W/DECALES AND FASTENERS
1,2	104413	SHROUD TOP KIT BLACK	W/DECALES AND FASTENERS
1,3	104408	SHROUD FRONT KIT RED	W/DECALES AND FASTENERS
1,3	104411	SHROUD FRONT KIT BLACK	W/DECALES AND FASTENERS
1,4	104409	SHROUD REAR KIT RED	W/DECALES AND FASTENERS
1,4	104412	SHROUD REAR KIT BLACK	W/DECALES AND FASTENERS
5	112406	THUMB SCREW 10 -32 x 3/4	

29

Wire Routing for Main Harness

Cable Tie

Power Harness

30
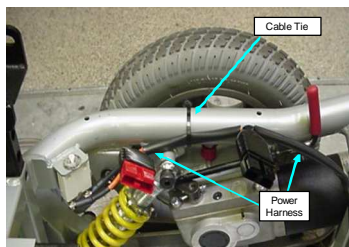
Wire Routing for Main Harness

- **Inline fuse requirement**
  - In order to satisfy a strict reading of ANSI/RESNA section 14 and properly protect the power wiring against over-current faults, a protection device must be placed as close to the battery terminal as possible. The circuit breakers we use do not lend themselves to this, so an inline fuse near the battery post is the preferred solution. These fuses are required whether the breaker is retained or not.

- **Advanced electronic controls**
  - The motor controllers that have become industry standard over the last 20 years now handle the motor overload protection function previously handled by the circuit breaker. The onboard microprocessor tracks the motor currents over time and reduces them according to parameters determined by motor and chair testing. In fact, because of PWM technology efficiency, the circuit breaker no longer sees enough current in a stall condition to properly protect the motors. This must be done by monitoring not the battery current but the actual motor currents as the controller does.

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Removal of Motor Assembly

Remove bolt from front arm first

Bolt with spacer & outside washer

Bolt with spacer & inside washer
Don't reverse linkage small offset

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Pulse 6: Motor Assembly

Pos.	Item Number	Description	Remarks
1,2,3A,1S-14	104222	MOTOR ASSEM ELECTROCRAFT L VR2	LEFT - PULSE 6 W/VR2
1,2,3A,1S-14	104223	MOTOR ASSEM ELECTROCRAFT R VR2	RIGHT - PULSE 6 W/VR2
1,2,3B,1S-14	104129	MOTOR ASSEM ELECTROCRAFT R Rivet	RIGHT - PULSE 6 W/ Rivet
1,2,3B,1S-14	104130	MOTOR ASSEM ELECTROCRAFT L Rivet	LEFT - PULSE 6 W/ Rivet
5	103929	MOUNT MOTOR WELDMENT L	LEFT
5	103929	MOUNT MOTOR WELDMENT R	RIGHT
8,9	103935	COG RELEASE HANDLE AND PINS	PAIR
1,2,3A,4-14	105426	MOTOR ASSEM EC L VR2 W/COG	LEFT - PULSE 6 W/ VR2
1,2,3A,4-14	105429	MOTOR ASSEM EC R VR2 W/COG	RIGHT - PULSE 6 W/ VR2
1,2,3B,4-14	105419	MOTOR ASSEM EC L DE W/COG	LEFT - PULSE 6 W/ Rivet
1,2,3B,4-14	105427	MOTOR ASSEM EC R DE W/COG	RIGHT - PULSE 6 W/ Rivet
15	139197	BRUSH/CAP SET ASI (2 POLE)	2 brushes, 2 caps

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33

11

Pulse 6: Motor Assembly*

*After S/N PLS-101619

Pulse 6: Suspension

Adjustable Shock

Front Arm Linkage

Damper

Pulse 6: Disassembly of Leaf Spring*

*Discontinued 5/09

Remove 2 outside bolts
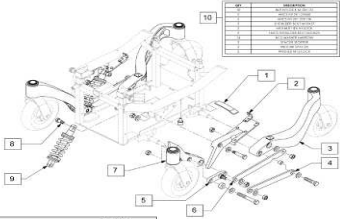
Remove 2 inside bolts & fixed bracket

Access to Leaf Spring

Pulse 6: Suspension

Pos.	Item Number	Description	Remarks
1	103007	LEAF SPRING REAR ASSY	
2	103523	MOUNT MOTOR WELDMENT L	LEFT
2	103528	MOUNT MOTOR WELDMENT R	RIGHT
3	103928	CASTER ARM REAR RIGHT ASSY	RIGHT
3	103903	CASTER ARM REAR LEFT ASSY	LEFT
4	104426	MIDLINK ASSEM PAIR	PAIR
5	103512	MIDLINK BRKT PRNTWLDMNT LH	LEFT
5	104426	MIDLINK BRKT PRNTWLDMNT RH	RIGHT
6	103909	PIVOT TO PIVOT LINK	PAIR
7	10390X	CSTER ARM FRONT RIGHT ASSY	RIGHT
7	10390P	CASTER ARM FRONT LEFT ASSY	LEFT
8	104437	HARDWARE SHOCK	
9	104423F	SUSPENSION 350LBS	
10	105590	HRDWR SUSP PULSE	KIT

Pulse 6: Controller Mount

- Mounts with positive lock
- Easy removal without tools
- Locks tight into frame

Group 3 Products

K0848

Frame seating, No Tilt

Pulse 6 BC

Quickie Rhythm w/ ASAP seating

Invacare TDX SP w/ ASBA Seating

Pride Quantum 600 w/ Synergy Seating

K0856

Single power option

Pulse 6 SC

Quickie Rhythm w/ SPOT tilt

Invacare TDX SP w/ tilt

Pride Quantum 6000 w/ tilt

Rehab Power Ladder Example

Rear Wheel Drive

Quickie 646
K0877 & K0884

Quickie S636
K0856 & K0861

Quickie P222 SE
K0877

Quickie S-646 SE & P-222 SE

Updated - May 21, 2012

Changes to S646 and P222SE

- Standardize Motors and Electronics across the entire power portfolio.

- Simplify overall offering.

- Increase overall reliability.

- Update electronics to a more robust solution.

- Add an LED package so Europe can access these same products. The LED package is also becoming a popular group 4 option in the US.

Overview of the Upgrade

- Highlighted below are the primary changes to both the Quickie S-646 SE, Quickie S-222 SE, and in some cases the Quickie S-636

	Quickie S-636 (with standard motor package)	Quickie S-636 (with torque motor package)	Quickie S-636 (with community motor package)	Quickie S-646 SE	Quickie P-222 SE
HCPCS Code	K0856, K0861	K0856, K0861	K0856, K0861	K0868, K0877, K0884	K0868, K0877
Speed	6.5 mph	5 mph (25% more torque)	8.5 mph	8.5 mph	8.5 mph
User Weight Limit	300 lbs	400 lbs	300 lbs	250 lbs	350 lbs
Upcharge	0	$500	$1,000	$0	$0
Motors	Linix Motors	Linix Motors	Linix Motors	Linix Motors	Linix Motors
Electronics	VR2, R-net	VR2, R-net	VR2, R-net	VR2, R-net	VR2, R-net
Power Tilt	TRAX seating with integrated Tilt	TRAX seating with integrated Tilt	TRAX seating with integrated Tilt	TRAX seating with integrated Tilt	Rehab Tilt
Power Recline	Standard Rehab Recline Seat	Standard Rehab Recline Seat	Standard Rehab Recline Seat	Standard Rehab Recline Seat	Not Available
LED Light Package	Not Available	Not Available	Not Available	Available	Available
All available Quickie colors	Available	Available	Available	Available	Available

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Rear Wheel Drive - S636

S636
- Group 3
- Rnet and Linix motors.
- SC and MPC
- Single motor package.
- Same great features as S646

Quickie S-636

- Same Rear Wheel Drive Performance with Tilt OR Tilt and Recline capability as the S-646
- Same Shock Suspension as the S-646
- 6.5 mph **ONLY** w/ 0-300 lbs weight capacity
- Group 24 Batteries only
- Otherwise the same product as the S-646

S-636: Short Wheelbase

46

S-636: Short Wheelbase

- During tilt and recline, the dynamic rear anti-tip suspension is locked down (release levers open). Because the anti-tip is locked, the S-636 is able to support a shorter wheel base. Bottom line: shorter wheel base = greater maneuverability

Seat Down – Dynamic Anti-Tip Release Levers are depressed and anti-tip suspension is enabled

Seat Up – Dynamic Anti-Tip Release Levers are open and anti-tip suspension is disabled

47

S-636: RWD/MWD Hybrid

Traditional Mid-Wheel Drive Configuration

Traditional Rear Wheel Drive Configuration

- Mid-wheel drive chairs have optimal maneuverability in tight spaces

The S-636 is a rear biased mid-wheel hybrid that offers the best of both worlds

- Rear wheel drive chairs track straight at high speeds and have good curb climbing ability

48

S-636: Rear Tail Gate

- The S-636 has one of the most easily accessible battery compartments in the power chair market. It begins with:
  - A toggle clamp lock – easy to open, positive pressure lock
  - Fold down rear gate – supports battery tray

S-636: Servicing Batteries

- Batteries can be accessed without the user having to leave the chair.

S-636: What's New or Changing

- S-636 changed to R-net Electronics in May 2010
- Discontinuation of Smart Seat tilt and recline system – will keep tilt and move to current recline platform used on the Quickie Rhythm.
- Moved to Linix motors

S-636: Old Motors

Lever Arm Release   Old Motors   **Gear Release Freewheel**

Changing: Difficult to engage, often requires rocking to release

Changing: Complexity of gear box makes service more difficult. Also, occasionally leaks grease.

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S-636: New Motors

- Communication
  - No change in performance or price.
  - Only noticeable change is in the freewheel method
- New motor continues our commitment to make the product simple and reliable

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S-636: New Motors

Cog Release – Old Style	Brake Release – New Style
Push Force easier	Push Force greater
Difficult to engage	Easy to engage
Hand Operated only	Hand or Foot operated
Prone to leaking	Gearbox completely sealed
More moving parts	Less parts.
More complex	Simple

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18

S-636: New Motors

- Linix 4 pole motors

Part Number	Description
107247	Motor 10KPH 4 Pole LH
107248	Motor 10KPH 4 Pole RH

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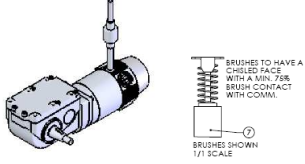P/N: 107247   S/N:????????M
Type: 90ZY24-4530/69MC26G2554-01
Motor: DC 22.5V   Brake: DC 12V
Gear Ratio 26 to 1   RPM: 163
Date Code: 090521   Rev: C
Brush Kit P/N: 112281   Class H wire
CE

Label with Details
including Brush Size

BRUSHES TO HAVE A
CHISELED FACE
WITH A MIN. 75%
BRUSH CONTACT
WITH COMM.

BRUSHES SHOWN
1/1 SCALE

LEAD WIRE CHART		
CONTROLLER CONNECTOR		
		WIRE
COLOR CODE	DESCRIPTION	mm
	BRAKE	
WHITE	BRAKE CONNECTOR	0.826
WHITE	BRAKE SWITCH	0.826
	MOTOR	
RED	+	4
BLACK	-	4
P/N 107247 = CCW OUTPUT SHAFT ROTATION		
P/N 107248 = CW OUTPUT SHAFT ROTATION		

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S-636: New Motors

Small Lever Release   New Motors   **Geared Freewheel**

New Motors feature easy to release levers

New motors are easy to maintain and do not leak grease

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S-636: Dynamic Suspension

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S-636: Full Suspension Base
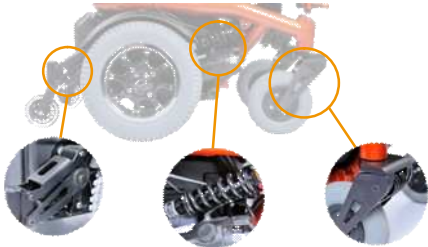
- The Quickie S-636 offers independent suspension at every point of contact with the ground. This virtually guarantees a smooth ride over rough terrain.

58

S-636: Traction Through Transitions

- The dynamic anti-tip suspension can move upward to keep the rear wheels in contact with the ground during transitions.

59

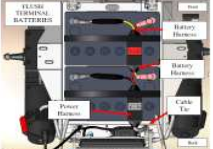## Key Features Example: Quickie QM-710

1 **Full Featured Complex Rehab Power Chair**
- Modular Components Available in 3 Models
- Industry Proven Components
- Sleek, Contoured Design

2 **High Performance Base**
- SpiderTrac Suspension
- Traction and Articulation
- Mid-wheel Drive Intuitive Handling
- Designed with Minimal Parts Complexity

3 **Comfortable and Modular Seating**
- Parts Commonality with Existing Group 3 Chairs

4 **Versatile Electronics (What's New on the QM-710)**
- Non-expandable Electronic Option for Challenging Funding
- Optimized Wiring
- Assignable Buttons (R-Net Only)

60

20

QM-710 – Battery Access

- The Batteries connect up in series
- The battery in the front has a single plug Red
- The back battery has the series connection and the Black connector for control wiring harness connection.

Front Battery

Rear Battery

61

QM-710 - Full Featured Complex Rehab Power Chair

Modular Components Available in 3 Models
- Quickie QM-710 (BC) – No Power Option Base with ASAP II Rehab Seat
- Quickie QM-710 (SC) – Single Power Option Tilt (SPOT) Base with ASAP II Rehab Seat
- Quickie QM-710 (MPC) – Multiple Power Option Base (SPOT Tilt and Recline) with Recline Rehab Seat

62

QM-710: Motors

- **Industry Proven Components - Linix Motors**
- Less than 1% return rate, lowest return rate in company history
- Same proven motor as used on the S-636, Pulse 6, and Rhythm
- Use unique dual end-of-line inspection system: both at vendor and at Quickie factory

63

QM-710: Sleek, Contoured Design

- Shroud Available in 5 Colors

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QM-710: Spider Track Suspension

- Stable, smooth transitions across multiple terrains
  – Each wheel independently suspends

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QM-710: Spider Track Suspension

- Gas springs provide a dampen to reduce the jolt of an impact
- Example of a spring suspension
- Example of a dampened suspension

Pure Spring Suspension
Very Bouncy

Classic Cadillac Dampened Suspension
Very Smooth

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QM-710: Spider Track Suspension

- When you slowly lower in a pneumatic office chair, it is the gas release that dampens the fall and/or impact.

Pneumatic Office Chair – classic example of a dampening system

67

Triggered Gas Spring Dampening

- PREVENTS collapse of the front casters
- PREVENTS shock associated with non-suspension fixed front casters

68

Triggered Gas Spring Dampening

- Gas dampening system, prevents collapse but dampens the impact
- User maintains seated position during transitions
  - Dampened contact reduces tonal responses
  - Helps prevent user displacement
  - Helps ensure a stable seating posture

69

23

QM-710: Traction & Articulation

- Climbs 3" curbs with a 22° transition angle
  - Design maximizes front caster articulation range
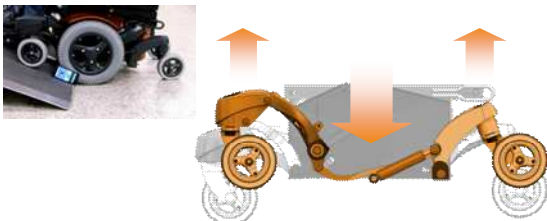
QM-710: Traction & Articulation

- Linked suspension moves casters and drive wheels in opposite directions to minimize high centering

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QM-710: Designed With Minimal Parts Complexity

  - 33% reduction in parts compared to legacy Quickie high-end power chairs
  - Fewer parts reduces
    - Fewer parts to potentially fall out of tolerance, which reduces potential breakdowns
    - No cable adjustments
    - Fewer parts to service creates a reduced service turnaround
    - Easier for technicians to understand

SpiderTrac Suspension: Gas Strut

– Suspension mechanism accomplishes two tasks with one mechanism

– Suspension prevents forward pitching and high centering with a single mechanism

The rear casters rotate downward as the chair goes over a curb, this triggers a constriction of gas flow in the gas spring, which dampens front caster impact and prevents caster collapse.

The linkage between the front caster and rear caster prevent high-centering. The same gas spring is used to absorb shock for both casters.

Removal of Pneumatic Gas Piston

Gas Spring Removal

- 1. Remove the wheel assembly by using a 5/8" deep socket wrench to remove the 3 bolts that hold the wheel and rim in place (figure1). Before removing the Gas Spring, raise the center of the chair with a lift so that the suspension can come all of the way down.
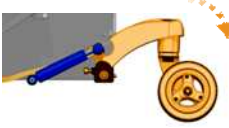- 2. For Gas Spring Removal, Remove the Lower holding bolt (A). using a 5mm Hex key (figure 2)
  Note: **The shocks used in this power base are pre-adjusted at the factory.**

- 3. Remove the top holding Bolt with a 6mm hex in Pic 3.

Removal of Pneumatic Gas Piston

- 4. Once the top holding bolt is removed, loosen the set screw (A) as shown by using a 4mm Hex wrench (figure 4)

- 5. Once set screw is loosened, the gas spring shaft can be unscrewed and removed from the securing point as shown in (figure 5)

- 6. To re-install the Gas Spring, Reverse the previous procedures. Be sure to adjust the the Gas Springs threaded shaft to the correct distance of 12-13mm for required installation clearance (C) as shown in (figure 6).
- Then tighten the Jam Nut (D) to secure the shaft at the correct distance, and replace the gas spring insert.

25

Quickie QM-715 HD and QM-720

Quickie QM-715 – 400 lbs
Heavy Duty Package – 5 mph

Quickie QM-720 – 300 lbs
High Speed Package

116515	MTR/GBX 4 POLE 6 MPH QM710 LH	Left,QM-710
116516	MTR/GBX 4 POLE 6 MPH QM710 RH	Right,QM-710
120636	MTR/GBX 8KPH 4POLE QM715 LH	Left,QM-715 or QM-710 High Torque
120637	MTR/GBX 8KPH 4POLE QM715 RH	Right,QM-715 or QM-710 High Torque
120638	MTR/GBX 13KPH 4POLE QM720 LH	Left, QM-720 or QM-710 Community Package
120639	MTR/GBX 13KPH 4POLE QM720 RH	Right,QM-720 or QM-710 Community Package

76

Battery Charger – BATC8-CT

- **Operation of Charger**
  1. **Green Flash - indicates power is on**
  2. **Orange Flash - indicates pre-charge**
  3. **Orange – indicates charging**
  4. **Green & Orange Flash – 80% charge rate**
  5. **Green – fully charged**

77

Back of Battery Charger

Inhibit

+ Positive

- Negative

78

R-net Expandable Electronics

- Provides simple programming options and outstanding reliability
- Features color screens on the joystick and OMNI display with a consumer clock
- Allows completely unique programming of profiles including the ability to mix proportional and non-proportional controls on one chair

---

VR-2 Non-expandable Electronics

- Penny & Giles VR-2
  - Programmable
    - With hand held or PC programmer
      - 1 profile with 5 speed increments
      - 5 profiles with 1 programmed speed
  - 70 amp controller
  - Uses the same parameters as Qtronix
  - Provides activation of 2 power options through the joystick
  - Controller to be used with a joystick only
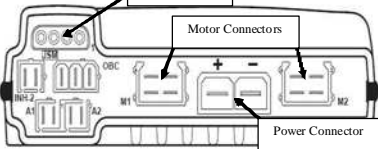
Pulse 6: VR2 (PG Drives) System
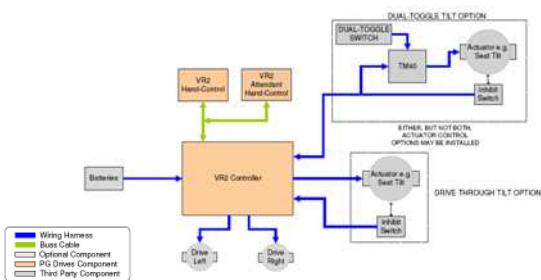
VR2-70 Controller

- Connector View

Bus Connector

Motor Connectors

Power Connector

VR-2 Thru Drive Tilt – Pulse 6
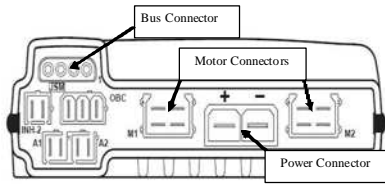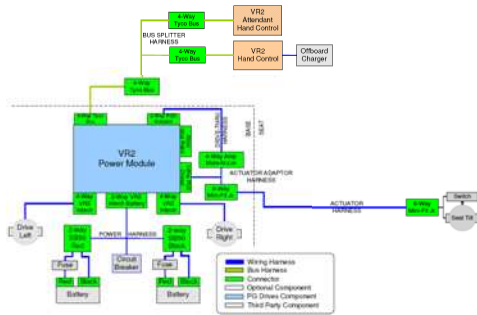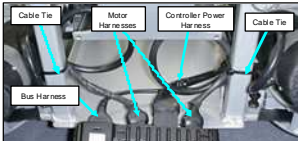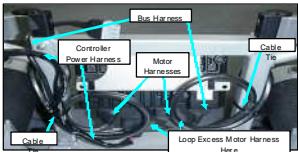
Tie Wrap Wiring for VR-2

Outside rear view
VR-2 shown

Inside rear view
VR-2 shown

R-net EL-90

- Penny & Giles R-net EL
  - Fully programmable, 5 profiles
    - With DTT or PC programmer
  - 90 amp controller
  - Uses the same parameters as R-net
    - Standard LED joystick (no screen)
  - Compatible with specialty controls
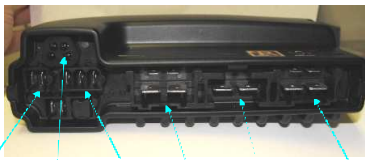
Optional Color Screen Joystick features OBP – On board programming through sequence or dongle for PC usage

Attendant Control : Easily hooks up and has Mode switch usage for other Modes of operation as well

85

R-net EL-90 Control Inputs

Inhibit Line
Off Board Charger   **Com Connection**   **O.B.C.**   **Motor 1**   **Power Connect**   **Motor 2**

86

R-net Features

- Simple programming with outstanding options
- Color screens
- Unique programming profiles
- Mix proportional and non-proportional controls in one chair.

87

VR2 Programming

VR2 Programming

- Programmer Face

?	Help Button:	Pressing this button displays information regarding the function you have selected. In menus, HELP tells you what each option does. In options, it tells you what to do next.
↑ Yes	Up / Yes Button:	This button steps up through the menu lists, increases the value of settings and selects functions
No ↓	Down / No Button:	This button steps down through the menu lists, decreases the value of settings and de-selects functions
↵ Enter	Enter Button:	This button selects options, settings and function states.

VR2 Programming

- **Acceleration**
  - Adjusts the value for forward acceleration of the wheelchair, in increments of 1.
  - The higher the value the faster the acceleration.
- **Deceleration**
  - Adjusts the value for forward deceleration (or braking) of the wheelchair, in increments of 1.
  - The higher the value the faster the deceleration.
- **Turn Acceleration**
  - Adjusts the value for the forward and reverse turn acceleration of the wheelchair, in increments of 1.
  - The higher the value the faster the acceleration.
- **Turn Deceleration**
  - Adjusts the value for the forward and reverse turn deceleration of the wheelchair, in increments of 1.
  - The higher the value the faster the deceleration.

VR2 Programming

- **Forward Speed**
  - This sets the MAXIMUM and MINIMUM forward speed of the wheelchair in increments of 1%.
  - There are two available settings.
- **Max**
  - The maximum value occurs at the control system's maximum speed setting.
- **Min**
  - The minimum value occurs at the control systems minimum speed setting

- The value is displayed as a percentage of the wheelchairs total available output.
- Therefore if the Max value is set to 80% then the wheelchair will be able to drive at up to 80% of the total available speed when the control system's maximum speed setting is reached.

91

VR2 Programming

- **Reverse Speed**
  - This sets the MAXIMUM and MINIMUM reverse speed of the wheelchair, in increments of 1%.
  - There are two available settings.
- **Max**
  - The maximum value occurs at the control system's maximum speed setting.
- **Min**
  - The minimum value occurs at the control systems minimum speed setting
  - The minimum value is interpreted differently in each control systems.
- **Pilot Reverse Speed**
  - This is automatically scaled in relationship to the forward speed setting and calculated as below.
    - Min. reverse = max. forward x min forward
- **Pilot+,VSI & VR2 Reverse Speed**
  - This corresponds to the actual value selected with the PP1a Programmer.

92

VR2 Programming

- **Turning Speed**
  - This sets the MAXIMUM and MINIMUM turning speed of the wheelchair in increments of 1%.
  - There are two available settings.
- **Max**
  - The maximum value occurs at the control system's maximum speed setting.
- **Min**
  - The minimum value occurs at the control systems minimum speed setting
  - The value is displayed as a percentage of the wheelchairs total available output.
  - Therefore if the Max value is set to 60% then the wheelchair will be able to drive at up to 60% of the total available speed when the control system's maximum speed setting is reached.
- **Power**
  - Reduces the power output of the control system.
  - The parameter is adjustable in steps of 1% between 10% and 100%.
  - The main purpose is to limit damage to furniture or doorways if the wheelchair is being used indoors. This is particularly useful on wheelchairs designed for children. If this parameter is used with the control system programmed for multiple drive profiles, then indoor and outdoor profiles can be set.

93

VR2 Programming

- **Torque**
  - The Torque parameter boosts the current to the motors at low speed settings. If the motor is stalled, for example, the wheelchair is stuck against an obstacle, such as a door threshold; then this will be automatically detected and the current to the motors will be increased, allowing the obstacle to be overcome.
  - Torque can be set between 0% and 100%
  - A value of 0% means the Torque parameter has no effect. Higher values mean that more current will be permitted in the described stall conditions.
- **Tremor Damping**
  - This parameter allows the effects of hand tremor to be reduced. If the user has a condition that results in hand tremor, then increasing the value of Tremor Damping will reduce the effect of the tremor, making the wheelchair more controllable.
  - Tremor Damping can be set between 0% and 100%
  - A value of 0% means Tremor Damping has no effect. Note, even at this value, there is inherent damping in the control system. Higher values apply a higher level of damping.

VR2 Programming

- **Preset Unit**
  - Selecting this sets all menu parameters to their default values. The default values are stored in the controller by PGDT during manufacturing.

- The Values given prior to the next page are values that are found in the profile of the Program and varies according to the 1st page which gives the different versions of PP1 or QTRONIX programmer versions

---

VR2 Programming

Global Settings
- **Sleep Timer**
  - A length of time can be set, such that if the control system accepts no valid input for that period of time, it will power down safely.
  - The time can be set in steps of 1 minute between 0 to 30 minutes.
  - If the value is set to 0, no power down will occur.

- **Steer Correct**
  - This factor compensates for any mismatching of motors to ensure that the wheelchair drives directly forward when the control system's joystick is being pushed directly forward.
  - It is normally set to zero but may be varied from -9 to +9 in increments of 1.
  - If the chair is veering to the left, you should increase the setting.
  - If the chair veers to the right, decrease the setting.

VR2 Programming

- **Joystick Throw**
  - This allows you to program the control system so that full speed can be reached with a reduced joystick movement (throw). This is particularly useful for wheelchair users with limited hand or arm movement.
  - The adjustment can be made manually or by programming actual values.

- **Speed Adjust**
  - Sets whether the control system's speed/profile buttons will be active while the wheelchair is driving. You can set this function to Yes or No.
  - Yes Means the control system's speed/profile buttons will be active while driving
  - No Means the buttons will only be active when the joystick is in the
  - central position.
  - This adjustment is particularly useful for users who may accidentally operate these buttons while deflecting the joystick.

VR2 Programming

- **Invert Joystick**
  - This parameter inverts the direction of travel when moving the joystick.
  - This parameter can be set to On or Off.
  - On Deflecting the joystick Forward will result in Reverse drive.
  - Off Deflecting the joystick Forward will result in Forward drive.

- **Actuator Selection**
  - There are two programmable parameters relating to actuator channel 1.
  - **Speed**
    - Sets the speed of travel of the actuator connected to channel 1. The speed can be set between 1 and 5. 1 is the slowest, 5 is the fastest.
  - **End Force**
    - This value should not normally require any adjustment and should not be altered without the permission of the wheelchair manufacturer. *Amount of current allowed*
  - **Actuator 2**
    - The same as one only in reference to actuator channel 2.

VR2 Programming

- **Actuator End Stop Bleep**
  - This allows the use of an Audible bleep to tell you when the Actuator is stalled at its end stop.
  - This parameter can be set to On or Off
- **Speed Adjustment while Driving**
  - This parameter sets whether the speed/profile buttons are active while the wheelchair is being driven. The parameter can be set to on or off.
  - **On** - Means the buttons are active while the wheelchair is being driven, so the user can make maximum speed setting adjustments (or select a different drive profile) while actually moving.
  - **Off -** Means the buttons are not active while the wheelchair is being driven, so the joystick must be released and the wheelchair at rest before maximum speed setting adjustments (or different drive profile selections) can be made.

VR2 Programming

- **Reverse Driving Alarm**
  - Sets whether the control system gives an audible warning while driving in reverse. The parameter can be set to on or off.
  - **On** - Means there is an audible alarm given.
  - **Off** - Means there is not.
- **Profiles**
  - A drive profile is a collection of programmable parameters comprising of Acceleration, Deceleration, Turn Acceleration, Turn Deceleration, Forward Speed, Reverse Speed, Turn Speed and Power. The number of drive profiles is determined by this parameter.
  - If the value is 0, there is one setting for each of the parameters listed previously, and the control system's maximum speed setting can be changed on the normal way.
  - If the value is 2 to 5, there is a corresponding number of drive profiles and each listed parameter can be individually set within a profile. The normal method of maximum speed adjustment can then be used to switch between the available profiles.

100

VR2 Programming

- **Read System Log**
  - The control systems have a diagnostics log facility which stores the number of occurrences of the last eight trip codes.
  - This allows you to view the contents. The display format is as below.
    - **1: Code 2C00, #1**
    - **2: Code 3C00, #3**
  - No more entries
  - This reads line by line as.
    - Line 1 - trip code 2C00 has occurred once
    - Line 2 - trip code 3C00 has occurred three times
  - Only two trip types recorded.
- **Read Timer**
  - Control has a timer which records how long the wheelchair is in use.
  - The timer runs whenever the joystick is moved away from the center position, and stops when the joystick is returned. The timer records the number of hours the wheelchair has been in use.

101

R-net Expandable Electronics

Joystick Modules

Attendant Module

Power Modules

Programming Key

Specialty Controls

Bus Expansion

Output Modules

Joystick Options

Handheld Programmer (DTT)

PC Programming

102

Diagnostic Test Tool

- The Diagnostic Test tool has been designed specifically to assist technicians, engineers and specialists. The DTT allows users to access, program and share PG Drive Technology controller specific files in a convenient and effective way.
- The Diagnostic Test Tool will allow users to:
  - Program PG Drives Technology controllers
  - Read and save program files
  - Read and save diagnostic logs
  - Read real-time controller related information
  - Save and delete program files locally
  - Save program files to external storage devices, such as memory sticks
  - Manage program + system log files from PC's. When connected the DTT appears as a drive on the PC and all normal PC functionality exists.

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Diagnostic Test Tool

- The DTT (Diagnostics Test Tool) has USB port. Files can easily be transferred using a USB drive.
- Holds up to 1000 profiles

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DTT Connections

USB Port (Type A)　　　　Programming Connector

- Two Cables
  - Neutrick Connector for VR2
  - R-net Connector for RNet

- USB an memory stick allows for file transfers and back-up of chair programming

R-net Conn　　Neutrik Connector

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35
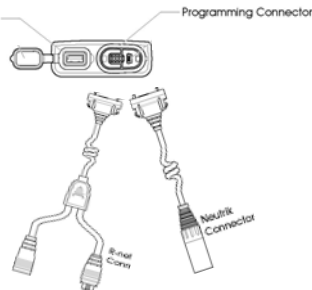
R-net Programming

- **On-Board & PC Programming**
  - On-Board Programming (OBP) uses the graphics LCD on the R-net Joystick Module to provide a clear display of multiple profiles, and allows for easy navigation and adjustment of the screens, using intuitive combinations of joystick movements and button presses. Access to OBP can be made secure via a keycode or a hardware key (dongle).
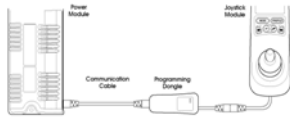
PC Programming
& OBP through Dongle

R-net On-board Programming

- **Mode Key Sequence**
  - **If the keycode method is set, then the following button sequence will allow entry to OBP:**
    - Note, a dongle will also allow OBP access if this method is set.

    1. Hold down the Horn button and then hold down the On/Off button until there is a short bleep.
    2. Power-up sound will occur prior to this bleep.
    3. Release the Horn button, but continue to hold down the On/Off button until there is a further short bleep.
    4. Release the On/Off button, there will now be a longer bleep and OBP mode will be entered.


R-net OBP Through Mode Switch

- **If the hardware dongle method is set, then a PGDT OBP Dongle needs to be connected to allow access to OBP. To use the dongle, follow the sequence below:**
  1. Turn off the control system.
  2. Insert the R-net Dongle along the communication cables in the system configuration. *See figure on Right side of Page*
  3. Turn on the control system
  4. After initialization press the Mode key until the OBP screen is reached. See diagram below.
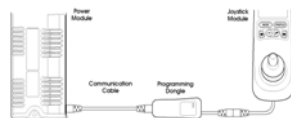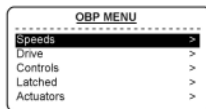
R-net OBP Programmable Speeds

FORWARD	
Fwd Accel Max	Sets Maximum Forward Acceleration
Fwd Accel Min	Sets Minimum Forward Acceleration
Fwd Decel Min	Sets Maximum Forward Deceleration
Fwd Decel Max	Sets Minimum Forward Deceleration
Fwd Speed Max	Sets Maximum Forward Speed
Fwd Speed Min	Sets Minimum Forward Speed
REVERSE	
Rev Accel Max	Sets Maximum Reverse Acceleration
Rev Accel Min	Sets Minimum Reverse Acceleration
Rev Decel Min	Sets Maximum Reverse Deceleration
Rev Decel Max	Sets Minimum Reverse Deceleration
Rev Speed Max	Sets Maximum Reverse Speed
Rev Speed Min	Sets Minimum Reverse Speed

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R-net OBP Programmable Speeds

TURN	
Turn Accel Max	Sets Maximum Turning Acceleration
Turn Accel Min	Sets Minimum Turning Acceleration
Turn Decel Min	Sets Maximum Turning Deceleration
Turn Decel Max	Sets Minimum Turning Deceleration
Turn Speed Max	Sets Maximum Turning Speed
Turn Speed Min	Sets Minimum Turning Speed
DRIVE	
Power	Reduces power to minimize risk of indoor fittings damage
Torque	Torque boost to overcome obstacles at low speed settings
Tremor Damping	Adjustable damping to reduce the effect of hand tremor

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R-net Programming

GLOBAL CONTROLS	
Steer Correct	Adjusts the PM output's to compensate for mis-matched motors
Sound Volume	Sets volume of audible feedback from JSM.
Endstop Beep	Sets whether there is a bleep when a seat axis reaches endstop
Act. Entry Axis	Sets the default axis when seat control mode is entered
Chge Prf in Drv	Sets whether profile changes are permissible while driving
Speed Adjust	Sets whether the speed buttons on the JSM are active
Speed Adj in Drv	Sets whether speed setting changes are permissible while driving
Momentary Screens	Sets Whether large screens appear at profile and speed changes
Rev Driving Alarm	Sets if the reverse driving alarm is active
EM Stop Switch	Allows latched operation without the use of an Em Stop Switch
Lock Function Enabled	Sets how the lock function is activated
Display Speed	Sets how the speedometer is displayed (miles or kilometers per hour)
Max Display Speed	Sets the operation of the graphical speed display
Power – Up Mode	Sets the Mode that will be active when the system is powered up

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R-net Programming

PROFILED CONTROLS	
Sleep Timer	Sets the time of inactivity before the system goes to sleep
Chge Mde in Drv	Sets whether mode changes are permissible while driving
Background	Sets the default background for each profile joystick
JOYSTICK	
Active Throw	Sets joystick throw via joystick movements
Throw Detail	Sets joystick throw via programming
Active Orientation	Sets joystick orientation via joystick movements
Orientation Detail	Sets joystick orientation via programming
Active Orientation	Sets joystick orientation via joystick movements
Orientation Detail	Sets joystick orientation via programming
Deadband	Sets the joystick deadband (size of neutral position)

R-net Programming

STANDBY	
Switch to Stdby	Sets whether an external button can be used to enter Standby Mode
Standby Time	Sets the time of inactivity before Standby Mode is entered
Mode Select	Sets whether other modes can be selected from Standby Mode
Remote Select	Sets whether a profile can be selected from Standby Mode
LATCHED	
Drive	Selects latched drive operation
Actuators	Selects latched actuator operation
Timeout	Sets the timeout period for latched operation
Timeout Bleep	Sets whether a bleep occurs as the timeout period approaches

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R-net Programming

SM ACTUATORS	
Away Speed	Sets actuator axis speed in the up direction
Home Speed	Sets actuator axis speed in the down direction
ISM ACTUATORS	
Away Speed	Sets actuator speed in the up direction
Home Speed	Sets actuator speed in the down direction
Acceleration	Sets actuator acceleration
Deceleration	Sets actuator deceleration

DTT Programming

File Management

Programming Menus

DTT Diagnostics

Immediate Diagnosis
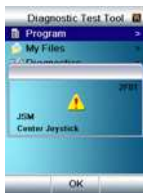
System Tests
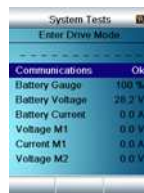
System Logs

Don't Forget!

- Please fill out evaluation
- Please take Test for CEU's
- Please fill in SSN's

- Have a great day!

Quickie Pulse 6 –
QM-710 – and S636
… simple, reliable

Thank You For Attending!

Ken Kalinowski, Senior Service Technician
Ken.kalinowski@sunmed.com

Appendix A

Specialty Control Parts

115207

DTT Kit Includes Cables

VR2 and R-Net

115211 Harness DTT - Neutrik

111423 Cable DTT R-Net

Appendix A

R-net Without Power Seating

R-net With Dual Toggle Tilt

Appendix B
Qtronix Joystick Change

- Qtronix Joystick replaced by Pilot and Joystick
  - Effective immediately on P222 SE, S-646 and S-646 SE models
  - Functions as direct replacement in most scenarios

Qtronix Joystick Change

Functionality:

The new Pilot + joystick only is configured in two configurations with "1/8" Jack Ports" (118789) or with "Speed Pot & On/Off Switch" (118788).

The new Pilot + joystick mounts differently than the old Qtronix joystick and because of this the mounting plate needs to be changed on Fixed and Center mount Joystick Mounts and the entire Joystick arm needs to be replaced when a swing away mount is utilized. Please see below for replacement components depending on the joystick arm style.

Does your joystick utilize a Round or a Square tube?

Round Tube…..

Fix Mount you need to order		
481211	Q-tronix to Pilot+ adapter Bracket	Qty - 1
220120	8-32 x 1/2 Socket Head Screw	Qty - 2

Right hand Swing Away Mount you need to order		
882498	Complete Swing Away Joystick Mount	Qty - 1
220120	8-32 x 1/2 Socket Head Screw	Qty - 2

Left hand Swing Away Mount you need to order		
882499	Complete Swing Away Joystick Mount	Qty - 1
220120	8-32 x 1/2 Socket Head Screw	Qty - 2

Center Mount you need to order		
481489	Q-tronix to Pilot+ adapter Bracket	Qty - 1
220120	8-32 x 1/2 Socket Head Screw	Qty - 2
221090	1/4-28 x 3/8 Button Head Screw	Qty - 2

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124

Qtronix Joystick Change

Square Tube….

Fix Mount you need to order		
481211	Q-tronix to Pilot+ adapter Bracket	Qty - 1
220120	8-32 x 1/2 Socket Head Screw	Qty - 2

Right hand Swing Away Mount you need to order		
118824	Complete Swing Away Joystick Mount	Qty - 1
220120	8-32 x 1/2 Socket Head Screw	Qty - 2

Left hand Swing Away Mount you need to order		
118825	Complete Swing Away Joystick Mount	Qty - 1
220120	8-32 x 1/2 Socket Head Screw	Qty - 2

Center Mount you need to order		
481489	Q-tronix to Pilot+ adapter Bracket	Qty - 1
220120	8-32 x 1/2 Socket Head Screw	Qty - 2
221090	1/4-28 x 3/8 Button Head Screw	Qty - 2

Qtronix PN	Description	Pilot+ PN	Description	Feature Comparison				
				Pot	Toggle	Jacks	Right Hand	Left Hand
139515	REMOTE BOX W/O JACK R S525	118788	JOYSTICK P+ POT/TOG NO JACKS	√	√	NA	√	NA
139516	REMOTE BOX W/JACK R S525	118789	JOYSTICK P+ JACKS NO POT/TOG			√	√	NA
139517	REMOTE BOX W/O JACK L S525	118788	JOYSTICK P+ POT/TOG NO JACKS	√	√	NA	NA	
139518	REMOTE BOX W/JACK L S525	118789	JOYSTICK P+ JACKS NO POT/TOG			√	NA	

√ Feature Retained

Feature lost

NA Feature not available on Qtronix JS

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125